

COMPLEX SIGNAL DECOMPOSITION AND MODELING

ABSTRACT OF THE DISCLOSURE

A system, method and program product for monitoring a complex  
5 signal for ultrasensitive detection of state changes, or for signature recognition and  
classification is provided. A complex signal is decomposed periodically for  
empirical modeling. Wavelet analysis, frequency band filtering or other methods  
may be used to decompose the complex signal into components. A library of  
signature data may be referenced for selection of a recognized signature in the  
10 decomposed complex signal. The recognized signature may indicate data being  
carried in the complex signal. Estimated signal data may be generated for  
determination of an operational state of a monitored process or machine using a  
statistical hypothesis test with reference to the decomposed input signal.

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